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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/055,878	01/28/2002	Ben Hui Liu	215518US23	2053

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BIO-INFORMATICS GROUP, INC
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EXAMINER

RILEY, JEZIA

ART UNIT	PAPER NUMBER
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1637

DATE MAILED: 05/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/055,878

Applicant(s)

LIU, BEN HUI

Examiner

Jezia Riley

Art Unit

1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-89 is/are pending in the application.
- 4a) Of the above claim(s) 54-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-53,88 and 89 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☒ Claim(s) 1-89 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☒ Other: Letter of Withdraw from issue.

DETAILED ACTION

1. It is noted that this application has regrettably been withdrawn from issue as stated in the letter mailed 4/16/2004. The following rejections and/or objections are newly applied. They constitute the complete set presently being applied to the instant application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17-35 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 recites the limitation "at least one plate disposed between the reservoir and the substrate" in line 4. There is insufficient antecedent basis for the limitations "the reservoir and the substrate in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section

Art Unit: 1637

351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-8, 10-12, 15, 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Guzman (US 6,406,604).

Guzman discloses an electrophoresis apparatus for sequentially analyzing a single sample or multiple samples having one or more analytes in high or low concentrations. The apparatus comprises a relatively large-bore transport capillary which intersects with a plurality of small-bore separation capillaries. The apparatus allows the performance of two or more dimensions for the optimal separation of analytes which is viewed to be inclusive of the 4D biochip. The electrophoresis apparatus comprises (see claims for example), an inlet opening for introducing a sample to be analyzed; a transport capillary extending in a longitudinal direction; at least one separation capillary disposed at a pre-selected angle relative to said transport capillary, wherein the transport capillary intersects and is in fluid communication with said at least one separation capillary; at least one analyte concentrator positioned adjacent to said transport capillary and said separation capillary; said analyte concentrator including a plurality of microstructures; wherein said inlet opening is provided by an introduction capillary having first and second ends with a non-specific analyte concentrator disposed there between and said introduction capillary is connected to said transport capillary; said separation capillary is perpendicular to said transport capillary. The electrophoresis apparatus comprises a plurality of separation capillaries which are disposed at pre-selected angles relative to said transport capillary.

Art Unit: 1637

In one aspect a sample including a number of analytes of interest is passed through a relatively large-bore transport capillary orthogonal to a plurality of smaller-bore separation capillaries. An analyte concentrator is positioned at each intersection of the transport capillary and separation capillaries. The migration of analytes can be accomplished by an electrical or mechanical pump. (col. 3-4 and figures).

As one embodiment, capillary electrophoresis is effective for obtaining rapid and high separations in excess of one-hundred-thousand plates/meter. Because it is a non-destructive technique, capillary electrophoresis preserves scarce physical samples and reduces consumption of reagents. A fused silica (quartz) capillary, with an inner bore diameter ranging from about 5 microns to about 200 microns and a length ranging from about 10 centimeters to about 100 centimeters, is filled with an electrically conductive fluid, or background electrolyte, which is most often a buffer.(col.1).

As shown in FIG. 1, apparatus 10 includes platform 12 having side wall 14. Sample cup 15 is mounted laterally on side wall 14. A large-bore , non-selective introduction capillary 16 and large-volume (1-3 ml) analyte concentrator 17 connect sample cup 15 to a first input of valve 18 which is coupled, by capillary 20, to waste container 22 positioned on side wall 14 adjacent to sample cup 15. In a typical configuration, analyte concentrator 17 comprises a matrix-like assembly. The collective mass of the matrix is provided by large quantities of microstructures such as beads, platelets, chips, fibers, filament or the like. Individual substrates can be made from glass, plastic, ceramic or metallic compositions, and mixtures thereof (which is viewed

Art Unit: 1637

to be inclusive of instant claims 11, 12). Coated or otherwise deposited onto the microstructures are immobilized analyte-specific antibodies or other affinity chemistries which are suitable for characterizing and separating particular analytes of interest (viewed to be inclusive of instant claim 10). (col.5).

In yet another embodiment, best shown in FIG. 3, transport channel 24A and separation channels 28A, 30A and 32A, having uniform and concave shapes, can be engraved, etched or otherwise formed into a glass or plastic microchip using known lithography or other manufacturing techniques. Analyte concentrators 34A, 36A and 38A are disposed at the respective intersections of transport channel 24A and separation channels 28A, 30A and 32A .

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-53, 88 and 89 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guzman (US 6,406,604) in view of Shmidt et al. (US 5,131, 994) in further view of Borrelli et al. WO99/55460.

Guzman is described above under 35 U.S.C. 102(e) rejection. However Guzman does not specifically shows that the voltage is reversible. But as shown by Shmidt et

Art Unit: 1637

al., method and apparatus are provided for the fractionation of charged particles with high resolution, which combines the simplicity of gel electrophoresis and sample recovery of free flow electrophoresis. (col. 1-2). It is disclosed that there are alternative methods for applying the electric field other than applying a DC voltage between spaced apart electrodes within the fractionation chamber. Many of these techniques are known from gel electrophoresis. An AC voltage can be applied between the electrodes whereby the changing polarity of the voltage causes the particles to first move in one direction and then to move in a reverse direction when the polarity changes. Typically the frequency of the AC signal is not uniform in that the time spent applying the first "positive" (or "negative") voltage is greater than the time spent applying the reversed voltage otherwise the net motion of the particles would not be in the forward direction. Another method involves employing a second pair of electrodes in the fractionation chamber for applying a voltage gradient substantially perpendicular (80.degree.-90.degree.) to the first voltage but still parallel to the membrane. Thus, a voltage gradient is applied using the first pair of electrodes followed by terminating this voltage and applying the second gradient using the second pair of electrodes whereby the particles begin to move at 90.degree. to their original direction. The second gradient can then be terminated and the first gradient reapplied, and so on. This causes the particles to follow a zig-zag path and is useful for causing the faster moving particles to travel a greater distance when this is desirable for separation of the particles. In addition to applying the voltage gradients described above it can also be useful to establish a pH

Art Unit: 1637

gradient parallel to the voltage gradient by any of the well known methods used in gel electrophoresis (col. 3).

Borrelli et al. discloses method and apparatus for transferring fluids. The reference provides a capillary reservoir and liquid deposition tools for depositing a high density biological or chemical array onto a substrate. Fig 1 shows a capillary reservoir device. Each channel within the device is self contained and decreases.

The tool is made up of plurality of open ended channels collectively forming a matrix. The matrix has been redrawn and cut such that the pitch of the channels on the loading end is far larger than the pitch of the channels on the liquid delivery end, the upper portion of each channel serves as a reservoir and, while the opposing end, which has been formed by the redrawing process, is diametrically sized such that the liquid in the reservoir is retained by capillary pressure at the delivery end (page 3-4); which is viewed to be inclusive of the reducing arrayer apparatus of instant claim 17 for example.

Therefore it would have been obvious at the time the invention was made to make an electrophoresis apparatus for sequentially analyzing a single sample or multiple samples as taught by Guzam comprising a reservoir as taught by Borrelli. The motivation is that such methods and apparatus eliminates the need for liquid handling as between the capillary reservoir device and a substrate,. The devices load and unload precise volumes of liquid in multiples of 8, 12 or 96 wells at a time(pages 24-28).

Art Unit: 1637


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jezia Riley whose telephone number is 571-272-0786.

The examiner can normally be reached on 9:30AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Wednesday, April 21, 2004


JEZIA RILEY
PRIMARY EXAMINER